IR16 Series
Dual View Thermal Imaging Cameras
User Manual

Safety Warning:
The equipment described in this document uses a Class 2 laser. Under no account should anyone look directly into the laser beam or the laser beam exit aperture, irreversible damage to the eye may occur. The laser should not be operated when there are personnel in the imager's field of view.
Caution – use of controls or adjustments or execution of procedures other than those specified in this document may result in hazardous laser radiation exposure.

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1. Contents.

- The case.
- Camera.
- USB PSU and International adaptors.
- CD – User manual and software.
- USB cable (camera to PC).
- Quick start guide.

2. Product Guide

	Products			
	IR16DE	IR16DB	IR16DS	IR16DH
Features				
Visual Camera	√	√	√	√
Voice Annotation	√	√	√	√
Alarms		√	√	√
Sequencing		√	√	√
PiP	√	√	√	√
Fusion		√	√	√
Thermal Thru	√	√	√	√
2 Moveable Cursors	√			
4 Moveable cursors		√	√	√
Individual emissivity adjustment		√	√	√
-20°C to +125°C		√		
-10°C to + 250°C	√		√	√
+200°C° to +500°C°			√	√
+ 450°C° to + 900°C°				√
Illuminator	√	√	√	√

IR16DE
Ideal for use by both thermographers and maintenance engineers. The high quality images may be captured and manipulated in the camera allowing problems to be resolved on the spot. Images can also be downloaded to a PC for analysis and reporting.

IR16DS
The IR16DS has all the features and functions of the IR16DE with the additional capabilities of:-

- Multiple viewing options, with fused images.
- User selectable temperature range allowing measurements up to 500°C.
- Alarms.
- Sequence recording.

IR16DB
The IR16DB offers a better sensitivity making it especially suitable for building applications. The temperature range of -20°C to 125°C also makes it suitable for a variety of general purpose and maintenance applications.

IR16DH
The IR16DH combines the temperature range of the standard IR16DS with an extended range up to 900°C, allowing users to monitor plant and equipment operating at higher temperatures.

3. Main controls.

3.1. Back

3.2. Front

3.3. Hotkey buttons

The Hotkey functions are indicated by the icons or text displayed on the screen above them. These functions vary according to the operating options chosen by the user.

4. Getting started.

4.1. Switching the camera on/off

Press the on/off button and hold it for two seconds to switch the camera on.

Press and hold for three seconds to switch the camera off.

After switching on, it will take up to 30 seconds for the infrared image to appear. The image will periodically freeze for one or two seconds while the camera re-calibrates itself. This is normal operation, and the time between these calibrations will increase as the operating temperature of the camera stabilizes.

4.2. Charging the battery

The camera's battery is charged via the USB port. A fully charged battery will last approximately 5 hours. A green LED indicates charging which turns to red when the battery is charged.

Note: When the camera is connected to a PC via the USB cable it switches off and the PC sees the SD card as an external memory.

4.3. Changing the battery

Open the lock on the battery cover and remove the cover.

Remove battery.

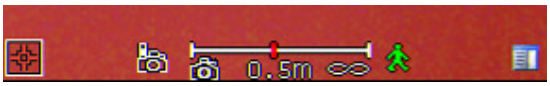
Insert new battery, ensuring the terminal pads are towards the front of the camera.

Replace and lock the cover.

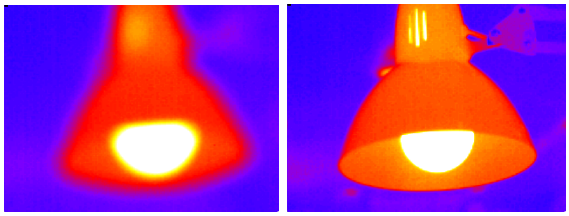
4.4. Focussing

Gently rotate the lens clockwise and anti-clockwise to focus the image.

- *Remember to remove the lens cap.*



Focus bar



Out of focus **Focused**

When focusing a focus bar appears on the screen to assist in focusing the image. It indicates the approximate distance in metres (in feet when °F is selected) of a focussed target from the camera.

4.5. Saving an image

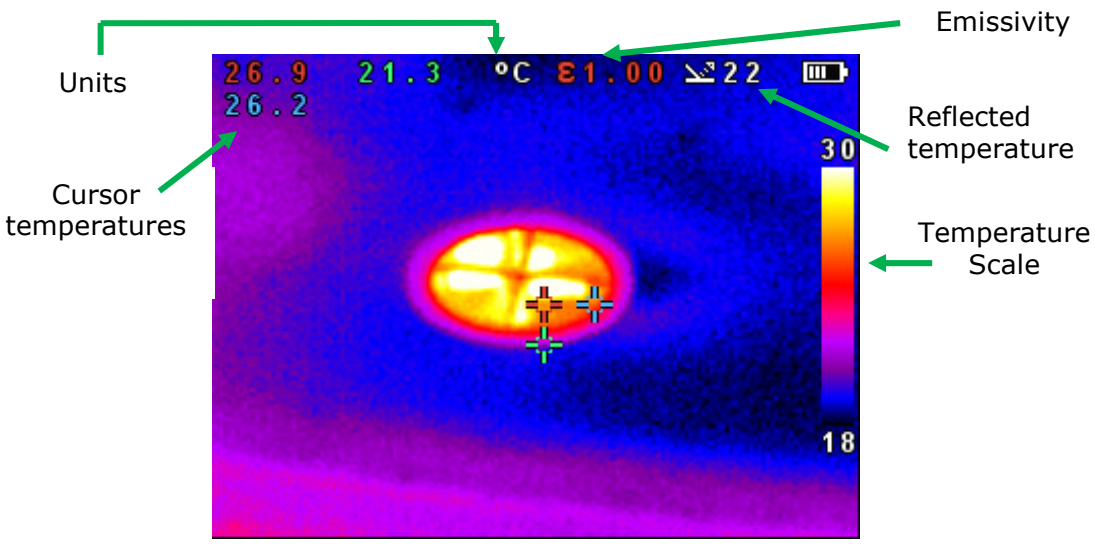
Save image button

To save a live or frozen image, press the Save button once. If Caption Mode or Voice Annotation has been turned on, a text caption or voice annotation can be attached to the image (see section 7).

4.6. Temperature measurement

One of the key functions of a thermal imager is obtaining temperature information about the scene. The IR16 has a variety of measurement options to provide maximum flexibility.

The display of temperature values and related items depends on the combination of the measurement and display options selected. Temperature readings are displayed at the top of the display. In the default mode, a single reading in ℃ indicates the temperature at the centre point of the cursor. The other reading at the top of the display is the reflected temperature setting (see section 6.1.). The temperature range within the scene is indicated by a scale on the right hand side of the display.



5. Hotkey buttons.

Pressing any of the hotkey buttons reveals the icons which indicate the functions of these buttons. A box around the icon for Hotkey1 or Hotkey2 indicates that this option is selected and this defines the operation of the navigation and toggle buttons. With the default settings, the key functions are as follows:

Hotkey 1 toggles between Align Image and Cursor.
Hotkey 2 cycles through Visible on/off, Auto/Manual, and Light on/off.
Hotkey 3 toggles between Live and Freeze.
Hotkey 4 opens the menu.

See appendix A2 for a full list of Hotkey button functions.

5.1 Moving the cursor

5.1.1. Press Hotkey 1 to toggle to the Cursor icon . The emissivity value will be displayed at the top of the screen.

5.1.2. Use the left/right and up/down navigation buttons to move the cursor to the desired position.

5.2. Image alignment

As the visible and thermal cameras are not co-axial the visible and thermal image may need to be aligned. This is usually required when moving to view objects at different distances.

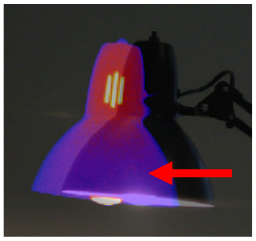
5.2.1. Press Hotkey 1 to toggle to the alignment icon .

5.2.2. Use the up/down and left/right navigation buttons to align the thermal and visible images.

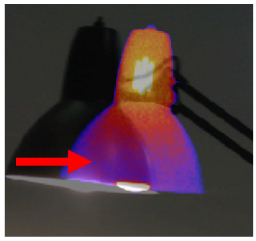
Note The visible image is moved during alignment.

Examples of alignment.

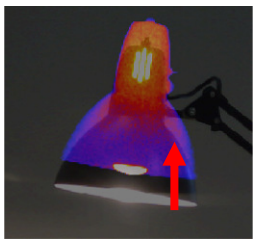
Fully Aligned



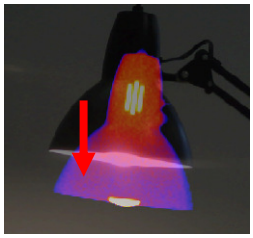
Align left



Align right



Align up



Align down

Four pre-programmed alignment distances are included. These are at 0.5m, 1m, 2m and 4m ranges. With the alignment option selected by Hotkey1, pressing the toggle button once aligns at 2 metres. Pressing the toggle button repeatedly cycles through to 4m, 0.5m, 1m, and 2m.

Note: These values appear in feet if °F is selected.

5.3. Turning the visible image off and on

5.3.1. Press Hotkey 2 to toggle to the Visible On icon.

5.3.2. Press the centre toggle button to toggle to Visible Off.

5.3.3. Press the centre toggle button again to toggle to Visible On.

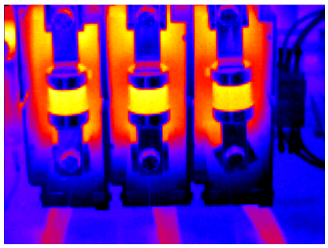
5.4. Thermal and visible image blending

The Irisys IR16 Series Thermal Imaging Cameras feature both a visual and thermal imager, and have the option to display the images in a variety of ways:-

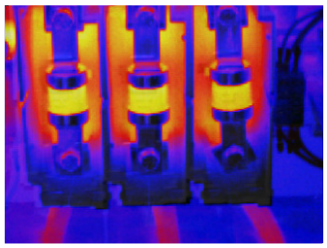
- Blended.- The camera can show a thermal image, a visible image of the scene, or a mixed blend of both. *Note blended is not available in the IR16DE.*
- PiP - a thermal picture in the visible picture (PiP) the thermal image can also be blended into the visible.
- Thermal above/below. - has the function of displaying Thermal bleed through on a visual image, based on the temperature range of the scene.

Blended and PiP Images.

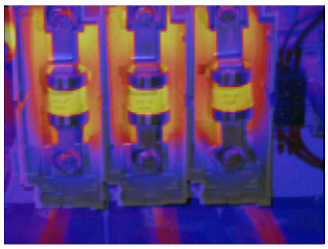
The thermal image ion the PiP option can also be blended.



100% thermal



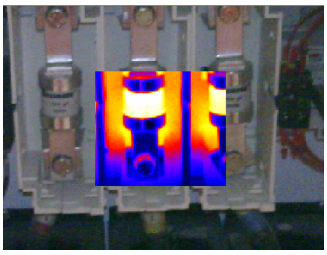
25% visible 75% thermal



50% visible 50% thermal

75% visible 25% thermal

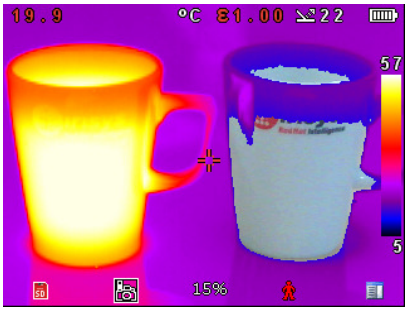
100% visible



Picture in Picture

THERMAL ABOVE

Thermal Above shows parts of the scene which are at the upper end of temperature range.



In this example the parts of the scene with temperatures above 15% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visible image.

In this example the parts of the scene with temperatures above 50% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visible image.

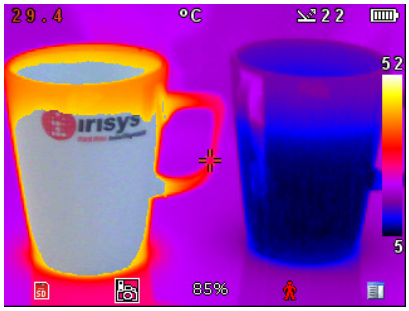
In this example the parts of the scene with temperatures above 85% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visible image.

THERMAL BELOW

Thermal Below shows parts of the scene which are at the lower end of temperature range.

In this example the parts of the scene with temperatures that lie below 15% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visual image.

In this example the parts of the scene with temperatures that lie below 50% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visual image.

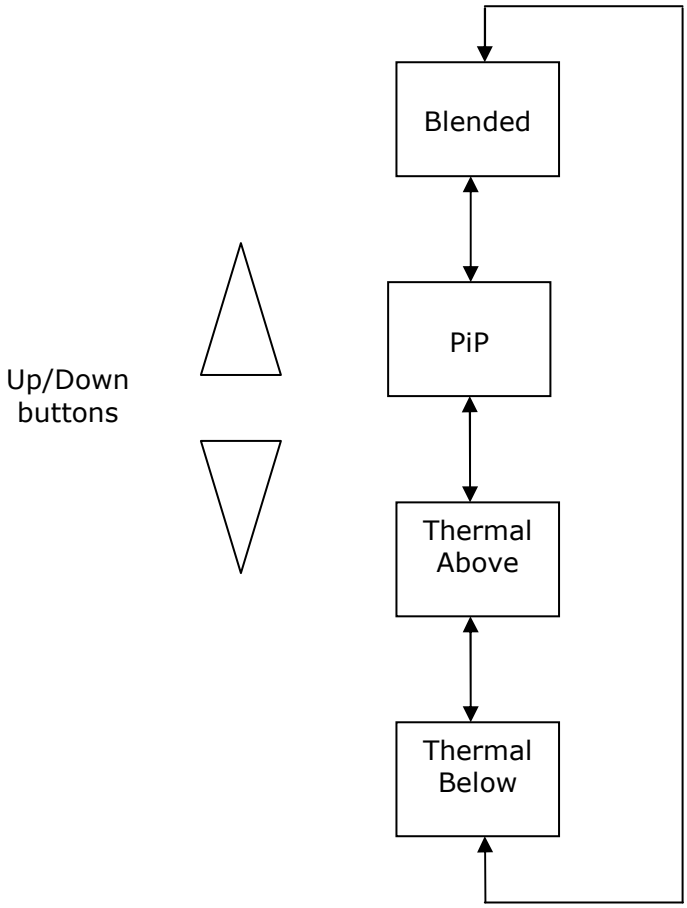


In this example the parts of the scene with temperatures that lie below 85% of the displayed temperature range are shown as a thermal image; whilst the rest of the scene is shown as a visual image.

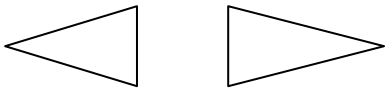
5.4.1. Press Hotkey 2 until the Visible On/Off icon appears

5.4.2. If off press the centre toggle button to toggle to Visible On.

5.4.3. Use the up/down navigation buttons to cycle through the viewing options. Use the left/right navigation buttons to select the blend levels and % of thermal above/below.



Left / Right Buttons



Blend – 0% -25%-50%-75%- 100% -0%

PiP – 25% - 50% - 75% - 100% - 25%

Thermal above/below -- in 5% steps

5.5. Manual control

The thermal image gain and offset are normally controlled automatically in order to give a meaningful display on the screen. However, Hotkey 2 offers the option of switching to manual control if desired:

5.5.1. Press Hotkey 2 to toggle to the Auto icon .

5.5.2. Press the centre toggle button to toggle to Manual or Persistent manual. If Persistent manual is selected, then the manual settings are stored. When the camera is switched on again, and Manual selected, the stored span and level settings are used.

5.5.3. Use the left/right navigation buttons to change the span of the displayed temperature range.

5.5.4. Use the up/down navigation buttons to change the level of the displayed temperature range.

5.5.5. Press the centre toggle button again to revert to Auto.

5.6. Light

There is a visible illuminator for use in poor ambient lighting:

5.6.1. Press Hotkey 2 to toggle to the Light Off icon .

5.6.2. Press the centre toggle button to toggle to Light On .

5.6.3 Press the centre toggle button again to turn the light off.

It is advisable to turn the light on only when necessary in order to conserve battery power.

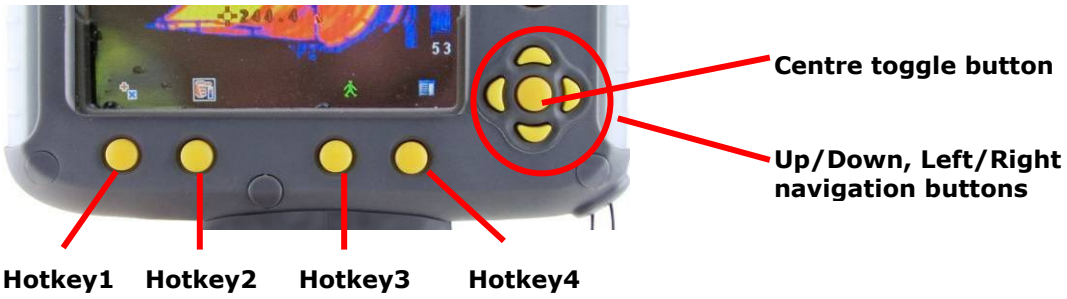
5.7. Image freeze

Pressing Hotkey 3 freezes the both the infrared and the visible image. Pressing again reverts to a live image. The image save facility works with either a live or a frozen image, but once a frozen image has been saved the camera will revert to a live image.

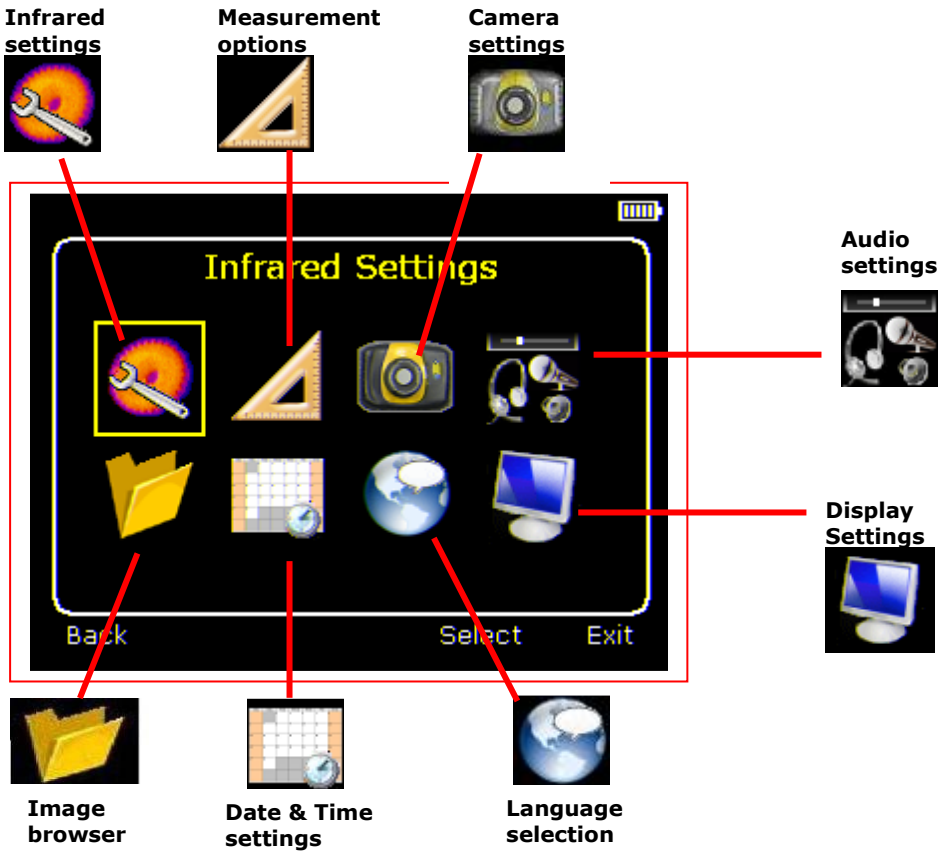
5.8. Menu

Hotkey 4 opens the menus. See section 6 for details of the menu structure.

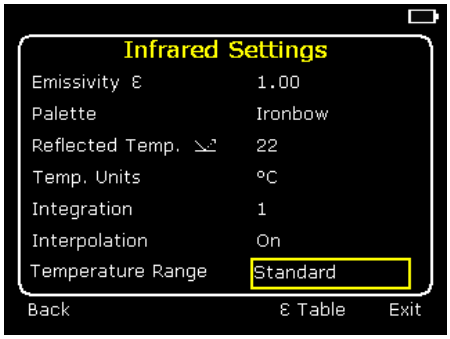
6. Menu structure.



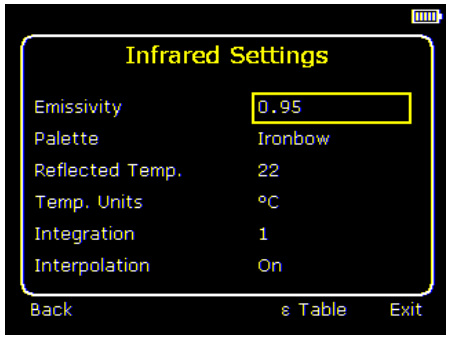
- Select the menu by pressing Hotkey 4.
- Navigate through the menu using the navigation buttons and press Hotkey 3 to select the required option. The highlighted item will have a box around it.
- Use the up/down buttons to move in the selected list and select the required item.
- Use the left/right buttons to change values and options for the specific item.
- Press Hotkey 4 to exit or Hotkey 1 to go back to the previous menu.



6.1. Infrared settings

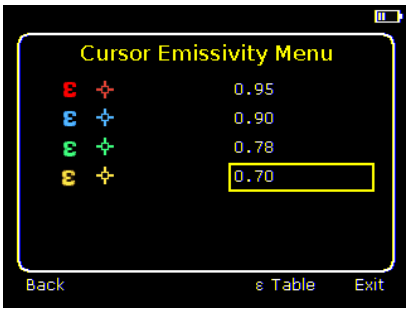


IR 16 DS and IR 16DH



IR16DE and IR16DB

- Emissivity
  Set the emissivity value between 0.10 and 1.00 using the left/right navigation buttons.
  Pressing Hotkey 3 (ε Table) gives a table of emissivity values of common materials from which a selection can be made.



Note that if more than one cursor is selected, individual emissivity's can be assigned to each cursor. (Not available on the IR16DE)

- Palette
  Display the image using different colour palettes.

1.	Ironbow	5.	High Contrast
2.	Rainbow	6.	Rainbow 16
3.	Isotherm Style	7.	Black Hot
4.	Hot Metal	8.	White Hot

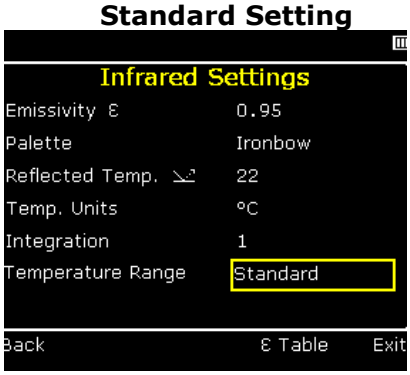
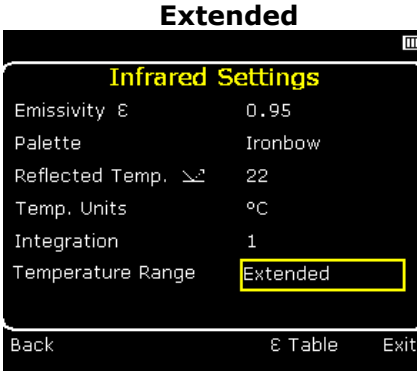
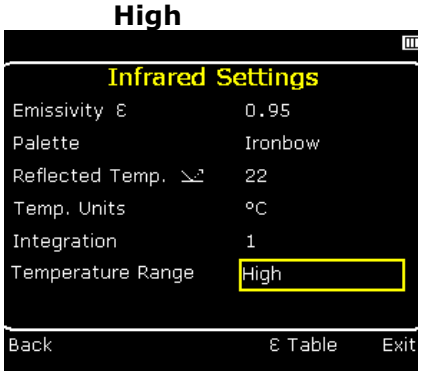
- Reflected Temp.
  Set this to the ambient temperature to correct for reflected radiation when an emissivity of less than 1 is selected.

- Temp. units
  Choose between °C and °F.

- Integration
  Chose an integration period from 1 (fast) to 4 (slow).
  A longer integration time will reduce the noise in the image, but will slow down the response to moving images.

- Interpolation
  Choose Off or On.
  This shows or hides the thermal image pixelation.

- Temperature Range
  Choose between Standard (-10°C to +250°C) or
  Extended range (+200°C to +500°C) on the IR16DS and also
  High range (+450°C to +900°C) on the IR16DH.

Standard Setting	Extended	High
		
IR16DS and IR16DH	IR16DS and IR16DH	IR16DH

Note: The temperature range for the IR16DE is -10°C to +250°C and the IR16DB is -20°C to +125°C.

On the IR16DH when selecting the High range, please also screw in the detachable filter provided on to the front lens. Each IR16DH is uniquely calibrated to the filter.
To select the High temperature range on the imager:-

6.1.1 Fit the filter by screwing it onto the imager lens as shown below.

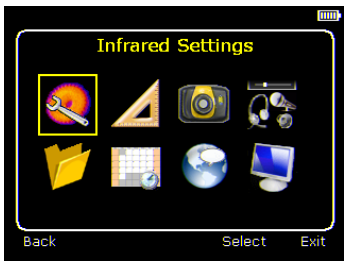
Figure 1. Filter being fitted.

Figure 2. Filter being screwed into place

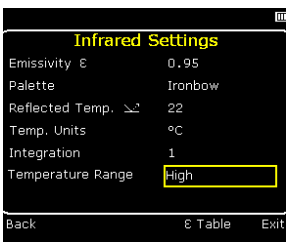
6.1.2 Select the correct calibration setting as described below.

6.1.2.1 Press Hotkey 4 to select the menu.

6.1.2.2. Select Infrared Settings

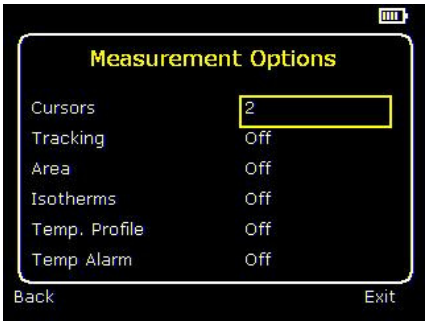


6.1.2.3. Navigate down to Temperature Range.

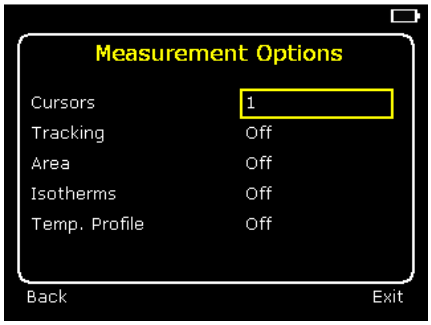


6.1.2.4. Select **HIGH** option.

6.2. Measurement options



IR16DS, IR16DH and IR16DB



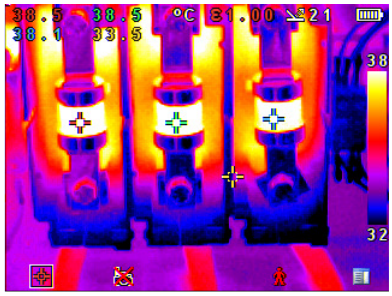
IR16DE

This menu enables the selection of options for temperature measurements. The symbols shown below indicate the icons shown for Hotkey 1 when the various options are selected.

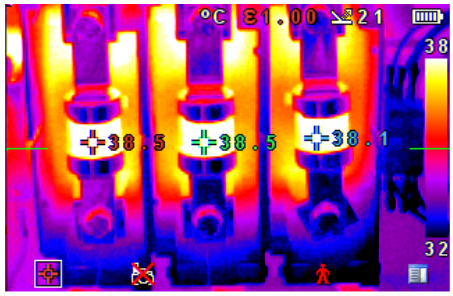
- Cursors

  . Choose from one to four cursors. (Two cursors on the IR16DE) When more than one cursor is selected, the temperatures of all the cursors are displayed in a table or are tagged next to the cursors (see section 6.8). When two cursors are chosen, the temperature difference between them is also displayed. When one of the cursors is selected by Hotkey 1, it can be moved around on the display by the navigation buttons.

  If two or more cursors are selected then individual emissivity values can be assigned to each cursor. When an emissivity less than 1.00 is selected for a cursor, then that cursor flashes on the screen. *Note individual emissivity selection is not available in the IR16DE.*



Tabular temperature values



Tagged temperature values

- Tracking

  .Select "High", "Low", or "High & Low" in order to track and measure the hottest point, the coldest point, or both hottest and coldest points in the image.

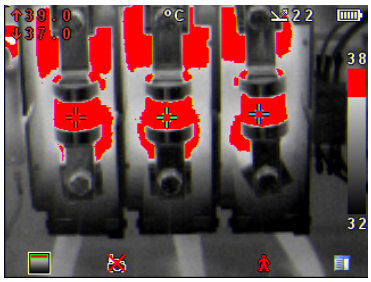
- Area

  .If this option is turned on, three different rectangular areas can be selected via Hotkey 1. The maximum, minimum, and average temperatures within the designated area will be displayed in the top left hand corner of the display.

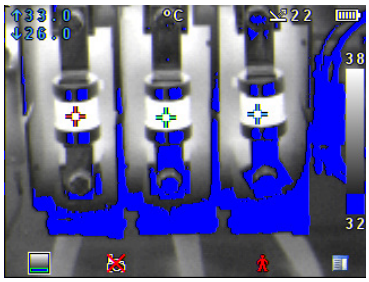
Note that the above three items are mutually exclusive, i.e. when one is turned on the other two are disabled.

- Isotherms

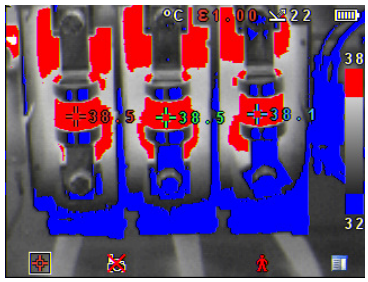
.Select "High", "Low", or "High & Low" in order to highlight areas of the scene with temperatures within a high (red) or low (blue) temperature band. The temperature bands are adjustable by means of Hotkey 1 and the navigation keys.



Red isotherm



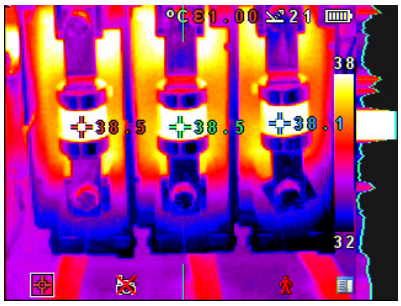
Blue isotherm



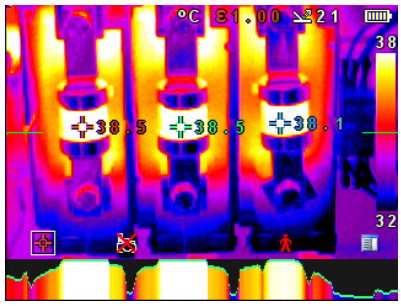
Combined isotherms

- Temp. profile

.Select "Horizontal" or "Vertical" to enable a histogram of temperature values along a horizontal or vertical cross section to be displayed on the right hand side or the bottom of the display. The position of the cross section is indicated by small arrows at the left and right or top and bottom of the image and can be adjusted by means of Hotkey 1 and the navigation buttons.



Vertical Profile

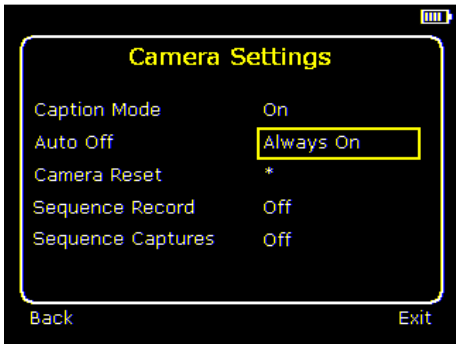


Horizontal profile

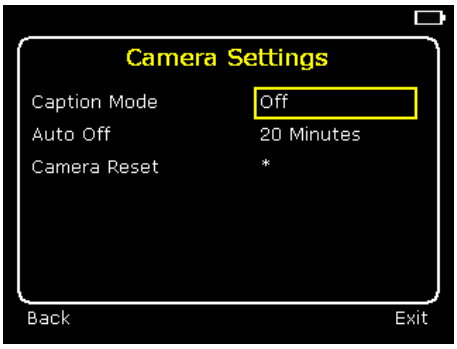
- Temp alarms

.Select "High", "Low", or "High & Low". Visual and audio alarms will be triggered if either cursor or a point within the designated area is higher or lower than a set temperature. The high and low set temperatures may be adjusted by means of Hotkey 1 and the navigation buttons. *Note: not available in the IR16DE.*

6.3. Camera settings



IR16DH, IR16DB and IR16DS



IR16DE

- Caption mode
  Select "On" to enable the addition of a text caption when saving an image. Options will then be displayed when saving an image, to be selected by means of Hotkey 2 and Hotkey 3.

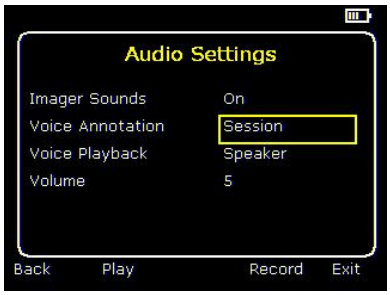
- Auto off
  Select "5 Mins", "10 Mins", "20 Mins" to allow the camera to switch itself off after a defined period of inactivity in order to save power or select the "Always On" option. In addition there is a "10 Min (dim)" where the LCD display is dimmed after 10 minutes of inactivity.

- Camera Reset
  Select with Hotkey 3 to restore the factory settings.

- Sequence Record
  Select this to save a set of images of the scene. The images are saved to the micro SD card and can be saved at intervals of 5 Sec, 10 Sec, 20 Sec, 30 Sec, 1 Min, 2 Min, 5 Min, 10 Min, 20 Min, 30 Min, 1 Hour and on Alarm. The alarm setting works in conjunction with the high low alarm function. When the temperature in the scene exceeds the user defined high alarm threshold temperature an image is saved. Equally when the temperature in the scene goes below the user defined low alarm threshold temperature an image is saved.
  Note this is not available in the IR16DE.

- Sequence Capture
  If Sequence Record is selected, then this option is switched on and allows the user to define the number of images to be saved. Choices available are 10, 50, 100, 500 and 1000 images.

6.4. Audio settings



- Imager sounds

  Select "Off" to mute all audible outputs.
- Voice Annotation

  Select "Individual" to add a voice message to each saved image.

  Select "Session" to add a voice message at the start of a set of images (A session ends when the imager is switched off).

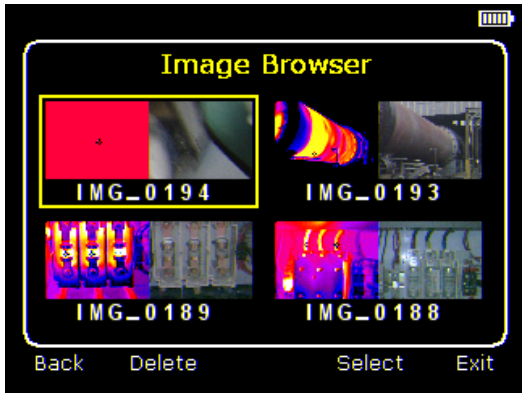
  Select "Combined" to add a common voice message at the start of a set of images and add additional comments for each image.
- Voice Playback

  Select "Speaker" or "Headset" for the desired method of audible outputs.
- Volume

  Select the volume of the audible outputs from 1 to 9.

If "Session" or "Combined" is selected the voice message is recorded before exiting the audio settings menu by pressing Hotkey 3. Recording is stopped by pressing Hotkey 3 again. Hotkey 2 can be used to play back the recorded message. Hotkey 3 can be used to re-record if necessary.

6.5. Image Browser

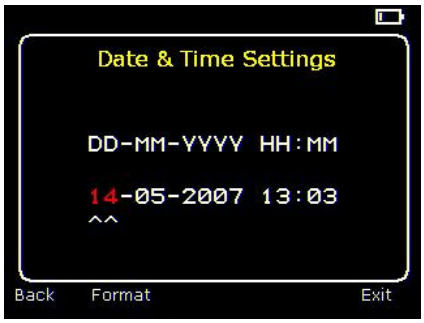


The saved images are shown on the screen with the most recently saved image first.

Select the desired image by means of the navigation keys.
To display the selected image press Hotkey 3.
To delete the selected image press Hotkey 2, to confirm deletion press Hotkey 3.

When a stored image is displayed, press Hotkey 3 to return to live imaging.

6.6. Date & Time settings

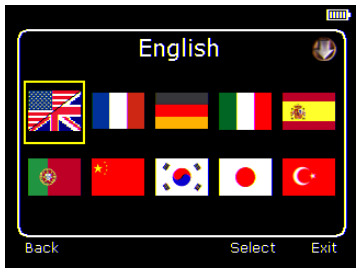


a) Use the left/right buttons to navigate in this menu, the item that can be changed is highlighted in red. In the picture above the day (DD) 14 is highlighted.

b) Use the up/down buttons to change the value.

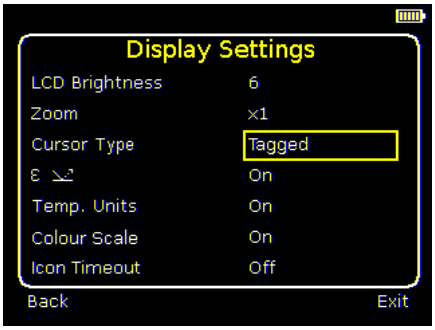
c) The date formats can be changed by pressing Hotkey 2 to cycle through DD-MM-YYYY, MM-DD-YYYY and YYYY-MM-DD options. Pressing Hotkey 4 will select the option on the display.

6.7. Language Selection



To select a language move to the relevant flag. When the language is highlighted press Hotkey 3 to select.

6.8. Display Settings

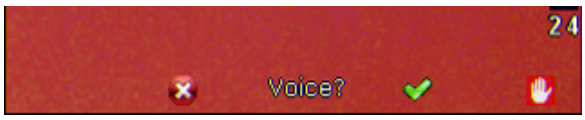


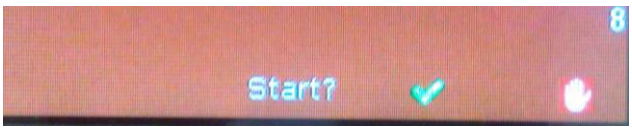
- LCD brightness
  Select from 1 (low) to 9 (high) to control the screen brightness to save battery power.
- Zoom
  Allows the user to digitally zoom into the image. Options are X2 and X4 zoom.
- Cursor Type
  Select how the cursor temperature values are to be displayed on the screen. The choice is between a tabular display or a tag next to the cursor.
- ε
  Choose whether or not to display the reflected temperature. Only applicable when emissivity is selected to be less than 1.
- Temp. Units.
  Choose whether or not the temperature units (°C or °F) are displayed on the screen.
- Colour Scale
  Chose whether or not the colour scale is to be displayed.
- Icon Timeout
  The Icons above the 4 hotkeys can be displayed either continuously or for 10 seconds after a hotkey is pressed.

7. Adding captions when saving images.

7.1. Voice message

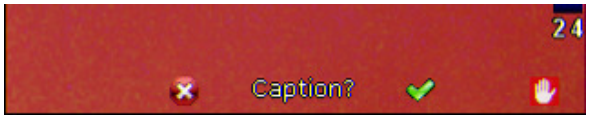
When saving an image with Individual Voice Annotation turned on, there is the option of saving a voice message with each image. The screen shots below describe the procedure:

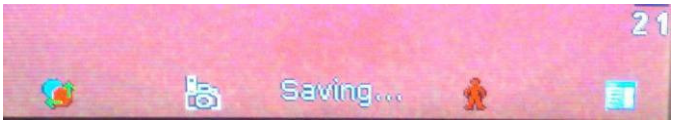
<table>
<tr>
<td> 

a) Do you wish to attach a voice message to this saved image?
Hotkey 2 for no. Hotkey 3 for yes.</td>
<td> 

b) Start voice recording? Hotkey 3 for yes.</td>
</tr>
<tr>
<td>

c) Stop Recording Hotkey 3 to stop.</td>
<td>

d) Option to Re-record the voice message?
Hotkey 2 for Yes Hotkey 3 for No</td>
</tr>
<tr>
<td> 

e) If caption mode is selected this option will now be offered to save a text caption (see 7.2).</td>
<td> 

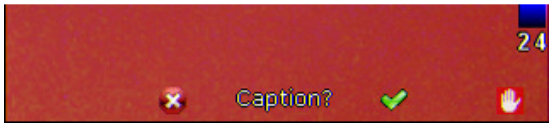
f) Image with voice message is being saved.</td>
</tr>
</table>

Playback
The voice recording can be played back when viewing saved images in the browser.

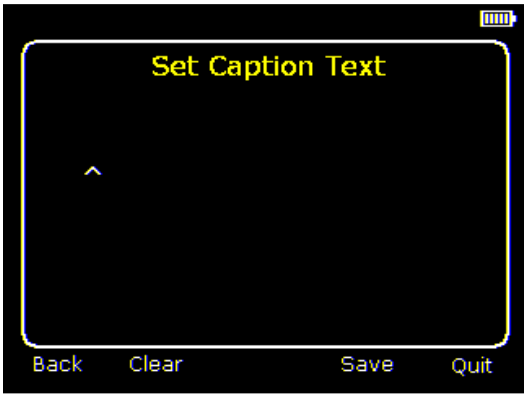
Note: ***The abort Icon on Hotkey 4.***
Pressing Hotkey 4 at any stage aborts the saving process.

7.2. Text captions

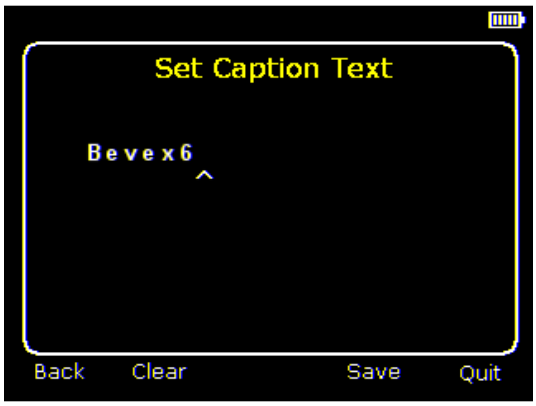
When saving an image with Caption Mode turned on, there is the option of attaching a text caption to each image. The screen shots below describe the procedure:



a) Do you wish to attach a text caption message to this image?
Hotkey 2 for No Hotkey 3 for Yes



b) Start Caption Entry



c) Example of a Caption.

1. Use the up/down arrow buttons to cycle through letters and numbers until the one required appears. The available symbols are:
   ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefg hijklmnopqrstuvwxyz0123456789
2. Use the left/right arrow buttons to move to the next space and repeat the above step until the caption is completed.
3. Press Hotkey 2 to clear the whole message.
4. Press Hotkey 3 to save the image and caption.

- ***Captions cannot be viewed with the saved images in the browser due to display constraints. The captions can be viewed using the PC software.***

Appendix

A1. Emissivity tables

Emissivity look up tables in Camera

1.00 0.98 = Human skin 0.95 0.94 = Paint, oil 0.93 = Red brick 0.92 = Concrete 0.90 = Planed Oak Wood 0.85 0.80 0.79 = Oxidized steel 0.78 = Oxidized Copper 0.76 = Sand 0.75 0.70 = Red Rust 0.67 = Water 0.65 0.64 = Oxidized Cast Iron	

General Emissivity Look up tables

0.98 = Carbon filed surface 0.98 = Frost crystals 0.98 = Human skin 0.97 = Slate 0.96 = Water distilled 0.96 = Ice smooth 0.95 = Soil saturated with water 0.95 = Carbon candle soot 0.94 = Glass polished plate 0.94 = Paint, oil 0.93 = Red brick 0.93 = Paper white bond 0.92 = Concrete 0.92 = Soil dry 0.91 = Plaster rough coat 0.90 = Wood planed oak 0.90 = Glazed earthenware 0.89 = Snow, granular 0.88 = Glazed Silica 0.87 = Cuprous Oxide at 38°C 0.86 = Emery Corundum 0.85 = Snow 0.85 = Stainless oxidized at 800°C 0.84 = Oxidised Iron at 500°C 0.83 = Cuprous Oxide at 260°C 0.82 = Snow, fine particles 0.81 = Brass, unoxidised 0.80 = Glass, convex D	0.79 = Steel oxidised 0.78 = Copper heavily oxidised 0.77 = Cotton cloth 0.76 = Sand 0.75 = Unglazed silica 0.74 = Oxidised iron at 100°C 0.73 = Coating No. C20A 0.72 = Basalt 0.71 = Graphitised carbon at 500°C 0.70 = Red Rust 0.69 = Iron sheet heavily rusted 0.67 = Water 0.66 = Black Loam 0.65 = White cement 0.64 = Iron cast oxidised 0.63 = Lead oxidised at 1100°F 0.62 = Zirconia on inconel 0.61 = Cu-Zn, brass oxidised 0.58 = Inconel sheet at 760°C 0.56 = Smooth white marble 0.55 = Al anodised chromic acid 0.21 = Iron cast polished 0.20 = Brass rubbed 80 grit emery 0.16 = Stainless steel 18-8 buffed 0.09 = Aluminium as received 0.07 = Steel polished 0.05 = Aluminium polished sheet 0.05 = Copper polished 0.03 = Brass highly polished

A2. Full icon list

Hotkey one

Cursor one

Cursor two

Cursor three

Cursor four

Alignment

Tracking

Area

Isotherm high

Isotherm low

Profile horizontal

Profile vertical

Alarm high

Alarm low

.

Hotkey two

Camera off

Camera on

Auto temperature range

Manual temperature range.

Manual persistent

Playback

Light off

Light on

No

Yes

Hotkey three

Live

Freeze

No

Yes

Hotkey four

Menus

Abort

Other Icons

Level Down

Level Up

Level Maximum

Level Minimum

Span Out

Span In

Span Maximum

Span Minimum

No Memory Card

A3. Technical specification

	IR16DE	IR16DB	IR16DS	IR16DH
Field of View	20° X 15°			
Focus	Manual			
Minimum Focus	30cm			
Spectral response	8µm to 14µm			
Thermal Sensitivity	NETD ≤80mK @ 23°C ambient and 30°C scene temperature	NETD ≤50mK @ 23°C ambient and 30°C scene temperature	NETD ≤80mK @ 23°C ambient and 30°C scene temperature	
Detector	160×120 element uncooled microbolometer			
Image Storage	Over 1000 images on supplied micro SD card			
Display	3 ½" colour LCD with LED backlight with 8 colour palettes. Electronic zoom (IR and visible) x2; x4; Image integration. Up to x4			
Display Options	Picture in Picture Thermal above and Thermal below	Thermal images or visible images or mixed thermal and visible images including picture in picture with blending Thermal above and Thermal below		
Laser Pointer	A built in Class 2 laser is supplied to highlight the centre of the thermal image (Aligned at 2 metres) Beam Divergence <0.2mrad Maximum Output <1mW			
Measurement				
Temperature range	-10°C to +250°C	-20°C to +125°C	-10°C to +500°C	-10°C to +900°C
Radiometry	Two moveable temperature measurement cursors with temperature difference measurement	Four moveable temperature measurement cursors with temperature difference measurement and individual emissivity correction Auto locking onto hottest and coldest points		
Emissivity Correction	User selectable 0.1 to 1.0 in steps of 0.01 with reflected ambient temperature compensation			
Accuracy	The greater of ±2°C or ±2% of reading in °C for the operating temperature range of -15°C to +45°C			
Imager power Supply				
Battery:	Rechargeable field replaceable Lithium-Ion			
Operation Time	5 Hours			
AC Operation:	USB AC power adaptor supplied			
Mechanical				
Housing	Impact resistant plastic with over moulded soft elastomer			
Dimensions	130mm X 95mm X 220mm			
Weight	0.8Kg			
Mounting	Handheld & tripod mounting $^{1}/_{4}$" BSW			
Interfaces	Data transfer direct from micro SD card or over USB Jack socket for headphones Built in microphone for voice annotation			
		Sequencing of images (IR only) to the SD card		
Environment				
Temperature operating range	-15°C to +50°C			

Storage range	-20°C to +70°C
Humidity	10% to 90% non condensing
IP rating	IP54
CE Mark	CE mark (Europe)
Vibration	MIL-PRF-288000F Class 2 section 4.5.5.3.1
Shock	MIL-PRF-288000F Class 2 section 4.5.5.4.1
Drop test	MIL-PRF-288000F Class 2 section 4.5.5.4.2 2 metres drop test

Optional Accessories
Light shade, battery, desk top charger, car charger, hard carry case.

Computer Requirements (for PC software)
IBM Compatible PC with one of the following operating systems:
Windows XP, VISTA, or Windows 7.
See Irisys website for currently supported operating systems.

Settings and Controls
- Auto/user selectable span and level control.
- Readout in °C or °F.
- Four moveable temperature measurement cursors with individual emissivity values and temperature difference between two points. (Not available on the IR16DE)
- User selectable emissivity setting for each measurement cursor. (Not available on the IR16DE)
- Auto hot and cold seeking or hot only or cold only.
- User selectable reflected temperature compensation.
- Area analysis – 3 options.
- X-Y thermal profiles.
- Isotherms with temperature difference.
- Voice and or text annotation.
- Image capture; time and date.
- Visual/audio alarm for above/below set temperature values.
- Palette selection.
- User selectable integration.
- Image fusion control: 0 to 100% adjustment on whole image and on picture in picture. (Not available on the IR16DE)
- Electronic zoom, x2 , x4.
- Multi-language options.
- Battery power indicator.
- Image browser showing thumbnails and voice annotation playback.
- Time or Alarm sequence recording. (Not available on the IR16DE)

IR 16DS Includes
IR Camera, Handle, Battery, AC Adaptor, Quick start guide, Carrying Case, CD with user manual and software (Analysis and report writer)

Open source software
This product contains open source software. Irisys hereby offers to deliver or make available, upon request, for a charge no more than the cost of physically performing source distribution, a complete machine readable copy of the corresponding source code on a medium customarily used for software interchange. This offer is valid for a period of 3 years after the date of purchase of this product. To obtain the source code, write to:
Development Department – Open Source
Infrared Integrated Systems Ltd.
The Barns
Park Circle
Swan Valley
Northampton
NN4 9BG
United Kingdom

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